ABSTRACT

A method and apparatus for generating excitation and model parameters in source filter models are described. In one embodiment, the method comprises generating synthesized speech samples, using a synthesis filter, in response to an excitation signal, determining a synthesis error between original speech samples and the synthesized speech sample and substantially reducing the synthesis error by computing both the excitation signal and filter parameters for the synthesis filter. The substantial reduction in the synthesis error is performed by applying a gradient descent algorithm to roots or LSPs of the polynomial representing the synthesis error over a series of iterations, and includes computing a gradient of the synthesis error in terms of gradient vectors of the synthesized speech samples by generating partial derivatives, using a recursive algorithm, for terms of a polynomial representing the synthesized speech samples over a series of iterations.